

In the Claims

41. (Fourfold amended) A semiconductor processing method of forming a conductive transistor gate over a substrate comprising:

forming a conductive gate electrode over a gate dielectric layer on a substrate, the gate electrode having sidewalls and an interface with the gate dielectric layer;

forming sidewall spacers comprising nitride on the gate electrode's sidewalls, the sidewall spacers joining with the gate dielectric layer; and

after forming the sidewall spacers comprising nitride, exposing the substrate to oxidizing conditions effective to channel oxidants through the gate dielectric layer and underneath the sidewall spacers joined therewith, wherein a portion of the gate electrode, laterally adjacent the sidewall spacers and at the interface with the gate dielectric layer, is oxidized.

43. The method of claim 41, wherein the gate electrode comprises a first conductive layer a portion of which defines the interface, an overlying metal layer, and an electrically conductive reaction barrier layer interposed between the first layer and the overlying layer.

Sub I 7
44. (Twice amended) The method of claim 41, wherein the forming of the sidewall spacers includes:

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depositing a first material over the gate electrode;

depositing a second material over the first material; and

anisotropically etching the first and second materials to a degree sufficient to leave the spacers over the gate's sidewalls, the spacers being defined by both the first and second material.

Sub H27 45. (Fourfold amended) A semiconductor processing method of forming a conductive gate comprising:

forming a conductive gate structure on a first layer which is disposed on a substrate, the gate structure comprising a gate electrode having sidewalls and an interface with the first layer;

forming sidewall spacers laterally adjacent the conductive gate structure's sidewalls sufficiently to cover all conductive material comprising the sidewalls, the sidewall spacers comprising an oxidation resistant material; and

after forming the oxidation resistant sidewall spacers, conducting an oxidizing step by channeling oxidants through the first layer which is outwardly exposed laterally proximate the oxidation resistant sidewall spacers wherein the oxidation resistant sidewall spacers provide that only a portion of the gate electrode, adjacent the oxidation resistant sidewall spacers and at the interface with the first layer, is oxidized.

46. The method of claim 45, wherein the layer through which oxidants are channeled comprises a gate dielectric layer.

Sub H37
47. The method of claim 45, wherein the gate structure comprises polysilicon layer, an overlying metal layer, and an electrically conductive reaction barrier layer intermediate the polysilicon layer and the overlying metal layer. H

Sub I7
48. The method of claim 45, wherein the forming of the sidewall spacers comprises:

depositing a first material over the gate structure;
depositing a second material over the first material; and
anisotropically etching the first and second materials to a degree sufficient to leave the sidewall spacers over the gate structure's sidewalls.

49. The method of claim 45, wherein the forming of the sidewall spacers comprises:

depositing a first material over the gate structure;
anisotropically etching the first material to a degree sufficient to leave first sidewall spacers over the gate structure;
depositing a second material over the first sidewall spacers; and
anisotropically etching the second material to a degree sufficient to leave second sidewall spacers over the first sidewall spacers.

Sub 144

50. (Fourfold amended) A semiconductor processing method of forming a conductive transistor gate over a substrate comprising:

forming a dielectric layer on a substrate;

forming a conductive gate structure over the dielectric layer, the gate structure having sidewalls defining a lateral dimension of the gate structure;

forming non-oxide material over the gate structure and the dielectric layer;

anisotropically etching the non-oxide material to form spacers on the sidewalls, the spacers laterally adjacent the gate structure and joining with the gate dielectric layer there at; and

exposing the substrate to oxidizing conditions effective to oxidize only that portion of the gate structure adjacent the spacers and the dielectric layer.

51. The method of claim 50, wherein the forming of the non-oxide material and the anisotropically etching thereof comprises:

depositing a first non-oxide material over the gate structure;

anisotropically etching the first non-oxide material to a degree sufficient to leave first spacers over the gate structure sidewalls;

depositing a second non-oxide material over the first spacers; and

anisotropically etching the second non-oxide material to a degree sufficient to leave second spacers over the first spacers.

Sub H57
52. (Fourfold amended) A semiconductor processing method of forming a conductive gate comprising:

forming a gate structure atop a substrate having a dielectric layer thereon, at least a portion of the gate structure being conductive, the conductive portion comprising:

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a polysilicon layer,

an overlying metal, and

a reaction barrier layer interposed between the polysilicon and the overlying metal;

covering a top and sidewalls of the gate structure with an oxidation resistant material, said covering comprising:

a first barrier material contacting the sidewalls, and

a second barrier material disposed over the first barrier material,

anisotropically etching the oxidation resistant material to a degree sufficient to leave the oxidation resistant material laterally adjacent to and covering all of the sidewalls of the gate structure while exposing the dielectric layer adjacent the gate structure; and

exposing the substrate to oxidation conditions effective to oxidize a portion of the gate structure laterally adjacent the covered sidewalls and adjacent the dielectric layer.

New Claim

53. A semiconductor processing method of forming a conductive gate comprising:

forming a gate structure atop a substrate having a dielectric layer thereon, at least a portion of the gate structure being conductive, the conductive portion comprising:

EX a polysilicon layer,

an overlying metal, and

a reaction barrier layer interposed between the polysilicon and the overlying metal;

covering a top and sidewalls of the gate structure with an oxidation resistant material, said covering comprising:

a first barrier material contacting the sidewalls, and

a second barrier material disposed over the first barrier material,

anisotropically selectively etching the oxidation resistant material relative to the ~~dielectric layer~~ to a degree sufficient to leave the oxidation resistant material laterally adjacent to and covering all of the sidewalls of the gate structure while exposing the dielectric layer adjacent the gate structure; and

conducting an oxidizing step by channeling oxidants through the dielectric layer which is outwardly exposed laterally proximate the

Fig 1.1
contd

oxidation resistant material wherein the oxidation resistant material provides that only a portion of the gate structure, adjacent the oxidation resistant material and at the interface with the dielectric layer, is oxidized.
